AN ESTIMATION OF THE IMPACT CHANGES IN THE MINIMUM WAGE HAVE ON EMPLOYMENT

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Introduction

The existence of a mandatory minimum wage is widespread among developed countries, the main aim being to enhance social equity. From a strictly economic standpoint, however, the theoretical literature emphasises that a minimum wage can also have an adverse impact on employment for certain groups of workers, especially those whose productivity level is below the minimum wage set by the authorities. In empirical terms, the studies available are not fully conclusive on the size and significance of this possible impact. Some studies find that increases in the minimum wage do not have a significantly adverse effect on employment [for example, Card and Krueger (1994 and 1995) for the US labour market],[2] whereas others find that they do [Neumark and Wascher (2000)]. For the case of Spain, in general the available studies show that there are adverse effects on younger workers, while for all other workers the findings are generally negligible [see, for example, Dolado et al (1996)].

In this setting, the increases in the minimum wage seen in Spain between 2004 and 2010 provide an interesting case study for a more in-depth empirical analysis of this issue. The data contained in the Social Security Administrative Labour Records (*Muestra Continua de Vidas Laborales*, hereinafter MCVL), which are the data used here, are particularly useful for this purpose, as they provide detailed individual information on workers' employment histories. The article is structured as follows: the second section summarises the development of the minimum wage in Spain in recent decades and compares it with the situation in other European countries; the third section briefly explains the methodology employed to analyse the impact of the recent increases in the minimum wage and describes the key findings; and the fourth section summarises the main conclusions.

Development of the minimum wage in Spain and international comparison

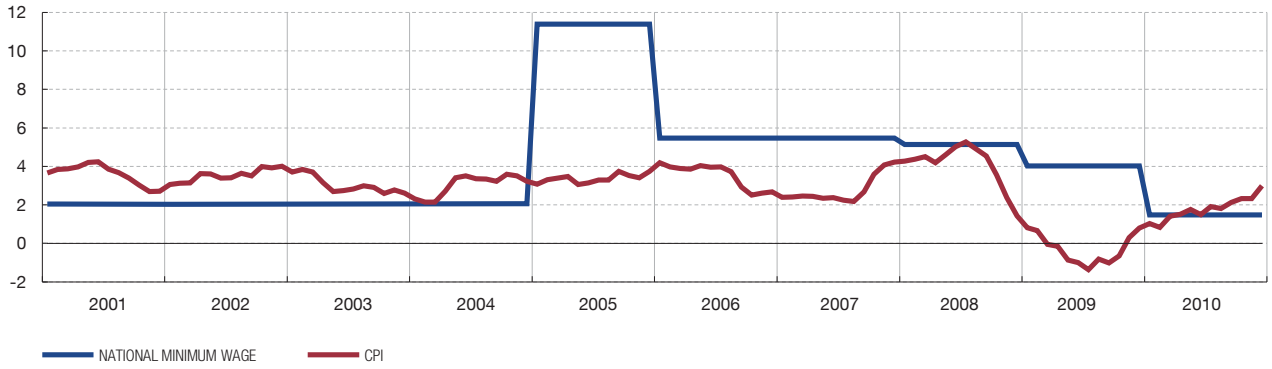
A minimum wage[3] was first established in Spain in 1964, but it was not until 1980 that a national minimum wage (*salario mínimo interprofesional*) was introduced. Since then, it has been set each year by the government, following consultation with the social partners, taking into account the change in the CPI, the average productivity of the Spanish economy, the increase in income from work as a share of national income and the economic situation, in accordance with the provisions of Article 27 of the Workers' Statute.

Initially three age bands were set for the minimum wage: one for workers under 17, a second for 17-year-olds and a third for workers over 17. However, since 1998, there has been just one national minimum wage for workers of all ages. As regards its recent development, as from the year 2000 the national minimum wage was raised annually by 2%, a figure that coincided with the ECB inflation target. However, in July 2004 the national minimum wage was increased by 6.6%, followed by a further 4.8% at the start of 2005, resulting in a cumulative leap of 11.4% in a single year. Subsequently, it continued to rise at a faster pace than the annual change in CPI. Overall, the national minimum wage went from €460.5 per month in 2004 to €633.3 in 2010, that is, a cumulative increase of 37.5%

1 This article is a summary of Working Paper No. 1237.
2 Machin and Manning (1997) and Portugal and Cardoso (2006) offer similar findings for European countries.
3 The national minimum wage is the minimum remuneration to be received by a worker for statutory working hours in any sector of activity, with no distinction by gender, age, type of contract, etc.

CHANGE IN THE MINIMUM WAGE AND THE CPI (a)
Year-on-year rates

CHART 1



SOURCE: INE.

a Minimum wage in nominal terms.

in that period. In 2011 the national minimum wage was raised by 1.3% and in 2012 it was frozen, at €641.4 per month.

Traditionally, the percentage of workers affected by the national minimum wage has been relatively low in Spain [see, for example, Dolado and Felgueroso (1997)], although the definition of workers who are considered affected often differs between studies and essentially depends on the information available according to the database used. In this article, the workers affected by increases in the national minimum wage are defined as those whose wages in a given year are lower than the following year's national minimum wage.[4] For this group of workers, increases in the national minimum wage are binding. Using this definition, and with the information obtained from the MCVL, the percentage of workers affected by the national minimum wage in Spain is quite low (see Table 1). Specifically, in each of the years analysed, the annual increases in the national minimum wage affected only 0.6% to 0.9% of all workers; however, this figure rises to 2% in the case of younger workers.

One determinant factor behind the limited impact of the national minimum wage on the Spanish labour market is the existence of minimum bargained wages which are higher than the national minimum wage.[5] Indeed, as can be seen in Chart 2, collective bargained wages, proxied by the base wage estimated by the Wage Structure Survey (*Encuesta de Estructura Salarial*),[6] clearly reduce the direct impact of the national minimum wage as they are higher, even for the least skilled workers.[7] The chart also shows how the changes in the national minimum wage between 2002 and 2010 seem to have been passed through to the collective bargained wage distribution, as over time the 10th, 25th and 50th wage percentiles have moved in parallel to the increases in the national minimum wage. This implies

4 This analysis excludes highly-skilled workers, defined as those included in contribution groups 1 to 3, who by definition will rarely be affected by increases in the national minimum wage. Moreover, wages are considered in real terms, that is, both individual wages and the national minimum wage are CPI-deflated. Lastly, a 12-month period is used to avoid seasonality problems.

5 Dolado et al (1997) record a similar finding for the 1980s and early 1990s, a period in which the gap between the national minimum wage and minimum bargained wages actually widened.

6 The methodology used by this survey defines the base wage as the essential and fixed part of the minimum remuneration agreed in collective bargaining agreements.

7 The chart shows the 10th, 25th and 50th percentiles of the base wage distribution for unskilled workers with less than one year's service, which is potentially the group most affected by the national minimum wage.

PERCENTAGE OF WORKERS AFFECTED BY THE REAL MINIMUM WAGE, BY AGE GROUP

TABLE 1

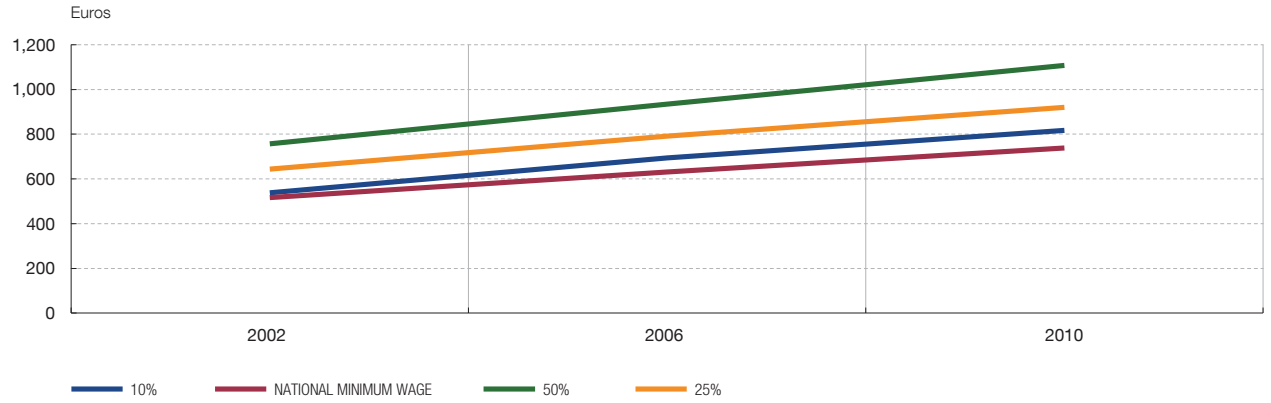
		Age groups			
	TOTAL	16-24	25-32	33-45	46-64
2004	**0.88**	1.74	1.01	0.69	0.63
2005	**0.78**	1.53	0.85	0.64	0.59
2006	**0.76**	1.48	0.79	0.64	0.62
2007	**0.59**	1.14	0.58	0.53	0.50
2008	**0.93**	2.06	0.87	0.83	0.77
2009 (a)	**0.14**	0.27	0.58	0.51	0.11

SOURCE: Social Security Administrative Labour Records (MCVL).

a The 2009 figure refers only to the period January-March, since as from April the national minimum wage declined year-on-year in real terms.

COMPARISON BETWEEN COLLECTIVELY BARGAINED WAGES AND THE NATIONAL MINIMUM WAGE (a)

CHART 2



SOURCE: INE.

a Unskilled workers in services and labourers in all other sectors.

that, although only a low percentage of workers is directly affected by the national minimum wage in Spain, a large percentage is indirectly affected by it, as a result of the collective bargaining process.

An international comparison (see Table 2) shows that, as a percentage of the average wage, the Spanish national minimum wage amounted to 32.9% in 2003 and to a high of 36.5% in 2007, below the figures for countries such as France, Belgium or Luxembourg.

Estimated impact of the minimum wage on employment in Spain

To assess the impact the recent increases in the national minimum wage have had on employment, the MCVL[8] provided by the Ministry of Employment and Social Security has been used. This database contains administrative records from the Social Security system and the Municipal Registers, with detailed individual information on workers' employment histories. Specifically, the different waves available (2004 to 2010) contain a sample of 4% of the population who have had at least one relationship with the Social Security system in the year.[9] In consequence, combining the waves available provides a highly representative sample of the entire population, excluding persons who have not been part of the labour

8 For workers in contribution groups 4 to 11 the minimum mandatory Social Security contribution, recorded in this database, is exactly one-twelfth of the gross annual national minimum wage, and thus permits a direct comparison.

9 This may be an employment relationship, or it may be, for example, unemployment benefit.

INTERNATIONAL COMPARISON: THE NATIONAL MINIMUM WAGE AS A PERCENTAGE OF THE AVERAGE WAGE TABLE 2

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	47.6	46.2	45.5	45.7	45.5	45.3	...	...	44.7	...
Bulgaria	38.8	40.4	41.4	46.6	44.7	42.1	39.5	38.3	35.8	33.7
Czech Republic	36.9	38.1	38.4	39.1	39.7	38.1	35.2	34.0	33.3	32.5
Estonia	30.5	32.4	34.6	33.2	30.5	30.4	34.9	36.2	35.6	33.8
Ireland	...	43.4	...	...	39.7	38.6	38.0	41.5	41.8	41.9
Greece	54.7	48.8	47.7	48.7	47.7	46.4	48.4	50.7	40.4	50.1
Spain	**33.5**	**32.9**	**33.6**	**35.1**	**35.8**	**36.5**	**35.2**	**35.1**	**35.3**	**34.6**
France	...	...	...	...	...	46.9	47.3	47.9	47.4	...
Latvia	37.4	39.9	41.9	36.2	33.3	34.2	36.2	40.9	42.2	45.1
Lithuania	43.7	42.1	45.4	44.9	42.1	38.7	39.6	40.5	42.0	41.1
Luxembourg	45.5	46.6	46.0	46.8	46.2	46.8	...	45.4	45.9	46.7
Hungary	42.1	42.2	41.2	41.3	41.7	39.8	38.5	38.6	38.8	39.1
Malta	44.9	48.2	47.4	50.5	50.4	49.0	48.8	45.2	46.2	47.4
Netherlands	49.3	47.7	46.1	45.5	44.1	44.2	44.2	44.1	44.6	...
Poland	33.0	33.9	35.1	33.7	36.1	32.4	35.7	39.7	40.4	38.3
Portugal	43.0	40.7	40.0	40.5	40.7	41.6	44.6	43.2	42.8	42.6
Romania	31.3	37.3	34.4	32.6	30.2	29.1	30.1	33.3	32.3	35.8
Slovenia	45.3	45.8	45.9	46.2	45.2	43.4	41.0	41.1	47.5	50.0
Slovakia	32.4	34.0	34.1	34.4	34.8	...	34.7	36.5	36.6	36.6
United Kingdom	34.6	34.5	36.5	37.9	37.9	38.9	38.1	38.4	38.2	38.5

SOURCE: Eurostat.

PROBABILITY OF EMPLOYMENT LOSS, DISTINGUISHING BETWEEN WORKERS AFFECTED/NOT AFFECTED BY THE NATIONAL MINIMUM WAGE (a) TABLE 3

	Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Workers affected (b)	NA	NA	NA	NA	16.7	16.6	15.3	18.2	23.7	21.7
Workers not affected	8.6	9.1	8.6	8.6	8.6	8.5	8.7	11.0	15.1	12.6

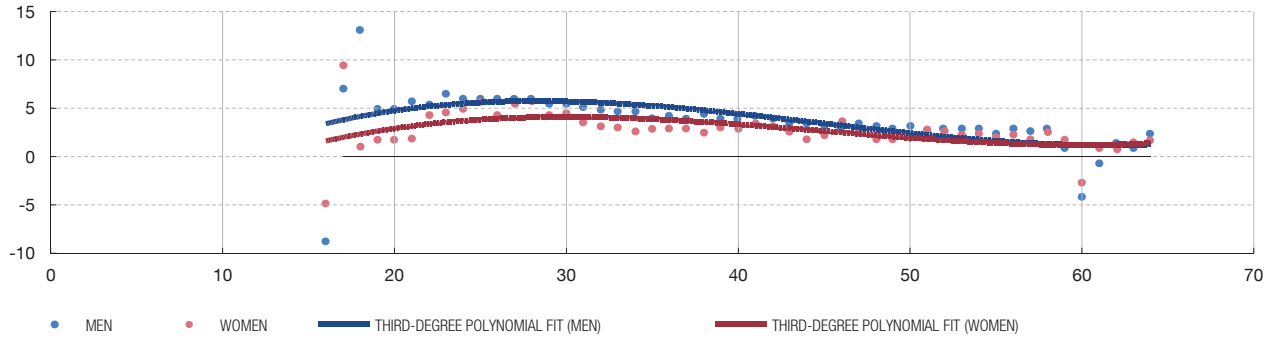
SOURCE: Social Security Administrative Labour Records (MCVL).

a Employment losses are observed on a 12-month horizon. In 2009 only the period January-March is included, since as from April the minimum wage declined.
b Between 2000 and 2003 there are no workers affected as there were no increases in real terms in the national minimum wage.

force at any time in the period 2004-2010. The database includes information on individual characteristics, such as gender, age or nationality, along with variables relating to the employment relationship, such as wages, type of contract, sector of activity or length of service.

Table 3 depicts the probability of workers losing their employment, drawing a distinction between the group of workers that may be affected by increases in real terms in the minimum wage, as defined above, and all other workers. It shows that between 2000 and 2006, the likelihood of workers in the second group losing their employment was between 8% and 9%, while the figure was much higher for workers potentially affected by increases in the minimum wage. Naturally, since the onset of the crisis, this probability has risen very significantly for the second group, reaching 15.1% in 2008. In any case, the most striking finding is that the likelihood of the group of workers affected by increases in the

WAGE PERFORMANCE BY GENDER AND AGE, 2003-2004 (a) CHART 3



SOURCE: Social Security Administrative Labour Records (MCVL).

a The profile is similar for any period not affected by increases in the national minimum wage.

minimum wage losing their employment is systematically higher (between 7 and 9 pp higher than for the other group). This greater probability of employment loss may possibly not be exclusively related to the existence of the minimum wage; the following paragraphs aim to isolate the impact of this factor from the possible impact of other factors such as different characteristics of workers.

One significant factor that may explain the different impact the national minimum wage has on different groups of workers is the way in which productivity changes during one's working life.[10] As shown in Chart 3, which reflects wage performance in the period 2003-2004[11] by gender and age, wage rises were higher among the intermediate age groups and lower both for younger and older workers. To the extent that this wage performance reflects productivity developments, it could be considered that those younger and older workers could be more affected by possible increases in the national minimum wage, as either group would find it difficult to achieve the productivity gains required to offset those increases.

To take into consideration this effect and, in general, all the other personal characteristics that may affect the probability of employment loss, a logit model[12] has been estimated, including, among others, explanatory variables such as age, nationality, household size, type of contract, length of service and individual wage. In this model, the variable that reflects the impact of increases in the minimum wage is the negative gap between a worker's current wage and the following year's minimum wage. The sample used is limited to 16- to 65-year-olds and to contribution groups 4 to 11. The first three columns of Table 4 show the estimated marginal effect of a €100 increase in the minimum wage on the probability of employment loss, distinguishing by gender and age.

The result is that increases in the national minimum wage have a positive and significant impact on the probability of workers in the group affected losing their employment, except for workers in the intermediate (25-32) age group. This effect is more pronounced for

10 In principle, productivity increases will differ by age group and will, therefore, affect the probability of employment loss differently.

11 Note that both Chart 3 and all the findings in this article relate to contribution groups 4 to 11, that is, to less-skilled workers, as they are the ones most affected by increases in the national minimum wage. All other contribution groups have a higher minimum contribution base, which means that potential increases in the national minimum wage do not affect them in the same way.

12 The dependent variable in the model is defined as the probability of employment loss on a 12-month horizon to avoid seasonality problems.

ESTIMATION OF A LOGIT MODEL ON THE PROBABILITY OF EMPLOYMENT LOSS. MARGINAL EFFECT OF A €100 INCREASE IN THE NATIONAL MINIMUM WAGE

TABLE 4

		Direct effect			Direct and indirect effect		
		Total	Women	Men	Total	Women	Men
Gap between wage and national minimum wage (a)	16-24 age group	7.6*** (2.05)	7.3** (2.94)	9.32*** (2.95)	7.91*** (2.05)	7.59** (2.94)	9.64*** (2.95)
	25-32 age group	2.6 (1.99)	4.0 (2.82)	1.9 (2.89)	2.72 (1.99)	4.17 (2.82)	1.9 (2.89)
	33-45 age group	5.129*** (1.97)	11.9*** (2.81)	2.0 (2.84)	5.32*** (1.97)	12.37*** (2.81)	2.0 (2.84)
	Over 45 age group	14.199*** (2.05)	17.95*** (2.92)	9.2*** (2.94)	14.44*** (2.05)	18.43*** (2.92)	9.24*** (2.94)
Gap between wage and 1.1x national minimum wage (b)	16-24 age group	...	...	...	1.59*** (0.28)	0.89** (0.42)	2.26*** (0.39)
	25-32 age group	...	...	...	0.67*** (0.26)	0.77** (0.34)	0.55 (0.4)
	33-45 age group	...	...	...	1.69*** (0.25)	2.72*** (0.36)	0.52 (0.37)
	Over 45 age group	...	...	...	3.19*** (0.33)	4.35*** (0.5)	1.21*** (0.45)

SOURCE: Social Security Administrative Labour Records (MCVL) (2005-2010).
NOTES: The control variables included are: year and month, age group, multiple job-holding, nationality, household size, type of contract, length of service and interaction month/gap between wage and national minimum wage.
*** Significant at 1%.
** Significant at 5%.
* Significant at 10%.

a Only estimated for those workers whose real wage is lower than the following year's real minimum wage.
b Only estimated for those workers whose real wage lies between the national minimum wage and 1.1x the following year's national minimum wage. This variable is not included in the first three columns, where only the direct effect is estimated.

younger workers, for whom the probability of employment loss rises by 7 pp, and especially for workers over 45, for whom the probability rises by 14 pp, in the event of a €100 increase in the national minimum wage. These differences are consistent with the average wage increases seen in Chart 2, as the most pronounced effects are concentrated among those groups for which productivity gains are least likely to be sufficient to offset increases in the national minimum wage. The analysis by gender (columns 2 and 3 of Table 4) confirms these findings, showing that the effect in the 33-45 age group is due exclusively to female workers.

As discussed in the second section of this article, to the extent that the collective bargaining process passes increases in the national minimum wage through to collective bargained wages, there could be an indirect impact on a much broader group of workers. In an endeavour to reflect this impact, the last three columns of Table 4 present an estimation of a new model, similar to the previous one, but also including an estimated impact for persons who are not directly affected by increases in the national minimum wage but whose wages are sufficiently low so as to be potentially indirectly affected.[13] The estimations indicate that this indirect effect is also positive and significant for all age groups, although less so than the direct effect of increases in the national minimum wage. Accordingly, the findings suggest that increases in the national minimum wage passed through to collective bargained wages may have raised the individual probability of employment loss

13 This second group of indirectly affected workers is defined as those whose wages are 1x-1.1x the following year's national minimum wage.

for this broader group of workers, but this effect would, in any case, be lower in quantitative terms than the direct effect associated with increases in the national minimum wage.

To sum up, even though only a small group of workers is potentially affected by increases in the national minimum wage, the impact on the likelihood of their losing their employment is significant, especially for certain groups, such as younger workers, in keeping with the findings of previous studies, and workers over 45 and female workers in the intermediate age groups. Moreover, a larger overall effect cannot be ruled out, to the extent that increases in the national minimum wage are ultimately passed through to the rest of the wage distribution through the collective bargaining process.

12.12.2012.

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